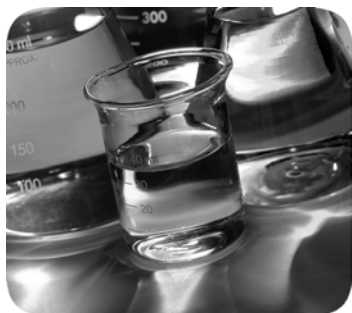


# GLT - Guard Locking with Time-Delay Safety Relay

Catalog Number 440R-GL2S2T



## Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

---

### IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

---

Labels may also be on or inside the equipment to provide specific precautions.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

---

Read this preface to familiarize yourself with the rest of the manual. It provides information concerning:

- who should use this manual
- the purpose of this manual
- related documentation
- conventions that are used in this manual

### Who Should Use This Manual

Use this manual if you are responsible for designing, installing, programming, or troubleshooting control systems that use the GLT safety relay.

You should have a basic understanding of electrical circuitry and familiarity with safety-related control systems. If you do not, obtain the proper training before using this product.

### Purpose of this Manual

This manual is a reference guide for the GLT time delay safety relay and accessories. It describes the procedures that you use to install, wire, and troubleshoot your controller. This manual:

- explains how to install and wire your safety relay
- gives an overview of the GLT safety relay performance

### Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

| Resource  | Description  |
|---|--|
| Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a> | Provides general guidelines for installing a Rockwell Automation® industrial system. |
| Product Certifications website, <a href="http://www.ab.com">http://www.ab.com</a>           | Provides declarations of conformity, certificates, and other certification details.  |
| Allen-Bradley® Industrial Automation Glossary, AG-7.1                                       | A glossary of industrial automation terms and abbreviations.                         |

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Definitions

Publication AG-7.1 contains a glossary of terms and abbreviations that are used by Rockwell Automation to describe industrial automation systems. Below is a list of specific terms and abbreviations that are used in this manual.

- **N.C. (Normally Closed)** – An electrical contact whose normal state (i.e., no pressure or electrical potential applied) is in the closed position.
- **N.O. (Normally Open)** – An electrical contact whose normal state (i.e., no pressure or electrical potential applied) is in the open position.
- **Reaction Time** - Describes the time between the true states of one input to the ON state of the output.
- **Recovery Time** - Describes the time that is required for the input to be in the LO state before returning to the HI state.
- **Response Time** - Describes the time between the trigger of one input to the OFF state of the output.
- **OSSD (Output Signal Switching Device)** – This is typically a pair of solid-state signals that are pulled up to the DC source supply. The signals are tested for short circuits to the DC power supply, short circuits to the DC common and shorts circuits between the two signals.
- **Single Wire Safety (SWS)** - This is unique, safety rated signal that is sent over one wire to indicate a safety status. The SWS can be used in Category 4.

|                                  |   |    |
|----------------------------------|---|----|
| <b>Preface</b>                   | Important User Information . . . . .              | 2  |
|                                  | Who Should Use This Manual . . . . .              | 3  |
|                                  | Purpose of this Manual . . . . .                  | 3  |
|                                  | Additional Resources . . . . .                    | 3  |
|                                  | Definitions . . . . .                             | 4  |
|                                  | <b>Chapter 1</b>                                  |    |
| <b>Overview</b>                  | Hardware Features . . . . .                       | 7  |
|                                  | Functions . . . . .                               | 7  |
|                                  | Function 1 - Guardlocking . . . . .               | 7  |
|                                  | Function 2 - E-stop . . . . .                     | 8  |
|                                  | <b>Chapter 2</b>                                  |    |
| <b>Installation</b>              | Mounting Dimensions . . . . .                     | 9  |
|                                  | DIN Rail Mounting and Dismounting . . . . .       | 9  |
|                                  | Removable Terminals . . . . .                     | 10 |
|                                  | Enclosure Considerations . . . . .                | 10 |
|                                  | Preventing Excessive Heat . . . . .               | 11 |
|                                  | <b>Chapter 3</b>                                  |    |
| <b>Power, Ground, and Wiring</b> | Wiring Requirements and Recommendation . . . . .  | 13 |
|                                  | Wire Size . . . . .                               | 13 |
|                                  | Terminal Torque . . . . .                         | 13 |
|                                  | Terminal Assignments . . . . .                    | 14 |
|                                  | Grounding the Controller . . . . .                | 14 |
|                                  | Connecting a Power Supply . . . . .               | 15 |
|                                  | Safety Devices . . . . .                          | 15 |
|                                  | Safety Devices with Mechanical Contacts . . . . . | 15 |
|                                  | Safety Devices with OSSD Outputs . . . . .        | 17 |
|                                  | Unlock Request Input . . . . .                    | 17 |
|                                  | Lock and Reset Request Input . . . . .            | 18 |
|                                  | Lock and Unlock Signals . . . . .                 | 18 |
|                                  | Retriggerable Input . . . . .                     | 18 |
|                                  | Outputs . . . . .                                 | 20 |
|                                  | Use Surge Suppressors . . . . .                   | 21 |
|                                  | <b>Chapter 4</b>                                  |    |
| <b>Configuration</b>             | Logic Switch Settings . . . . .                   | 23 |
|                                  | Range Switch Setting . . . . .                    | 24 |
|                                  | Time Switch Setting . . . . .                     | 24 |
|                                  | Configuration Switches . . . . .                  | 24 |
|                                  | Configuration Process . . . . .                   | 25 |
|                                  | Five Step Configuration . . . . .                 | 25 |
|                                  | Configuration Details . . . . .                   | 25 |

|  |   |    |
|--|---|----|
|  | <b>Chapter 5</b>                              |    |
| <b>Diagnostic LEDs and Troubleshooting</b> | LEDs During Power-Up .....                    | 27 |
|  | LEDs During Normal Operation .....            | 27 |
|  | LEDs During Diagnostics .....                 | 27 |
|  | Additional Diagnostics .....                  | 29 |
|  | <b>Chapter 6</b>                              |    |
| <b>Pulse Testing Functions</b>             | Pulse Testing For Inputs .....                | 31 |
|  | Pulse Testing of Outputs .....                | 31 |
|  | <b>Appendix A</b>                             |    |
| <b>Specifications</b>                      | General .....                                 | 33 |
|  | Environmental .....                           | 33 |
|  | Inputs IN1 .....                              | 34 |
|  | Lock Unlock Request .....                     | 34 |
|  | Retrigger .....                               | 35 |
|  | Outputs .....                                 | 35 |
|  | Lock Unlock Signals .....                     | 36 |
|  | Auxiliary Signal .....                        | 36 |
|  | Single Wire Safety Input Signal .....         | 36 |
|  | Single Wire Safety Output Signal .....        | 37 |
|  | Recovery Times .....                          | 37 |
|  | Response Times .....                          | 37 |
|  | <b>Appendix B</b>                             |    |
| <b>Regulatory Approvals</b>                | Agency Certifications .....                   | 39 |
|  | Compliance to European Union Directives ..... | 39 |
|  | Machine Safety Directive .....                | 39 |
|  | SIL Rating .....                              | 40 |
|  | Performance Level/Category .....              | 40 |
|  | EMC Directive .....                           | 40 |

## Overview

### Hardware Features

Figure 1 - GLT Relay



The GLT is a **Guard Locking with Time-delay** safety relay that is designed to use time-delayed outputs for use in Stop Category 1 and to unlock a safety gate when the time expires. It also provides a lock command to lock a safety gate before the starting of the hazard.

The GLT can be operated with other safety relays in the GSR family, by use of the “single wire safety” connection. When GLT receives a single-wire safety signal from other GSR relays, the GLT issues an Unlock command. When the GLT turns ON its safety output, it also turns ON its single-wire safety output for use by other GSR safety relays.

### Functions

The GLT can be configured to operate in one of two types of safety functions, both of which involve time-delayed safety signals.

#### Function 1 - Guardlocking

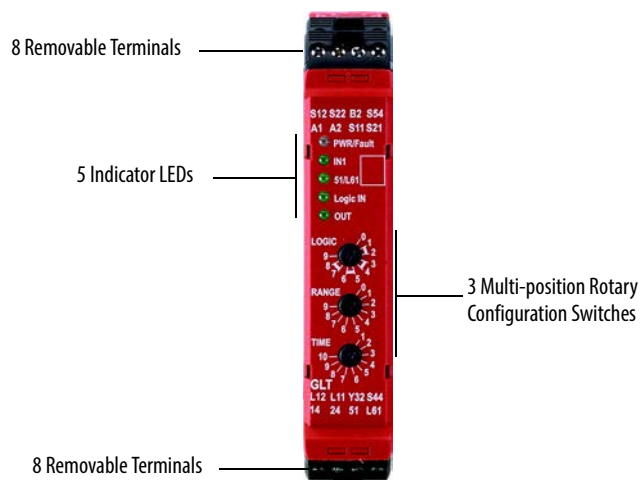
Function 1 is used for guardlocking applications. During production, the safety gate is locked in the closed position by a guardlocking interlock. To request access through the safety gate, the operator presses the Unlock Request button. The GLT initiates a stop and unlocks the safety gate after the time expires.

## Function 2 - E-stop

Function 2 is used for emergency stop applications. The production process requires an orderly shutdown. Some processes must be stopped immediately and some must be stopped shortly thereafter. To initiate the stop, the operator presses an E-stop button. The GLT initiates an immediate stop command followed by a delayed stop command.

[Figure 2](#) shows some of the key hardware features of the GLT.

**Figure 2 - GLT Hardware Details**

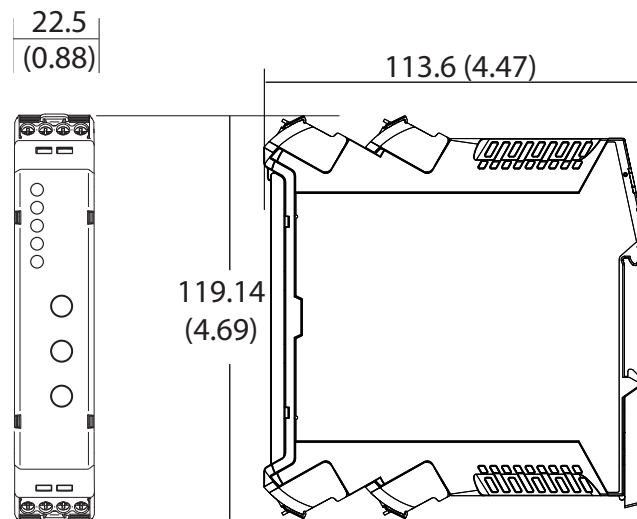




## Installation

### Mounting Dimensions

Figure 3 - Approximate Dimensions [mm (in.)]

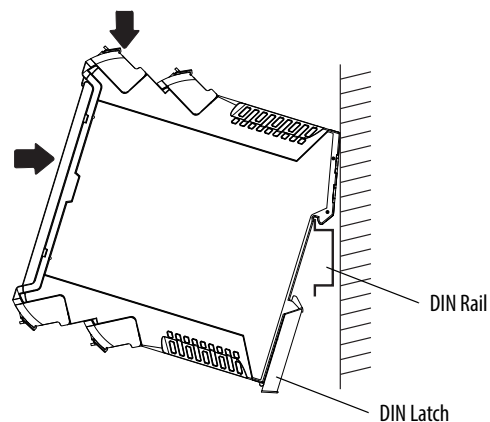


### DIN Rail Mounting and Dismounting

The GLT easily mounts onto 35 mm DIN Rails: 35x7.5x1 mm (EN 50022 - 35x7.5).

1. Hold the top at an angle
2. Slide down until the housing catches the rail.
3. Swing the bottom down and give a little push until the latch clips onto the rail.

Figure 4 - DIN Rail Mounting



**Removal** - To remove the GLT, use a flat blade screwdriver to pry the DIN rail latch downwards until it is in the unlatched position. Then swing the module up.

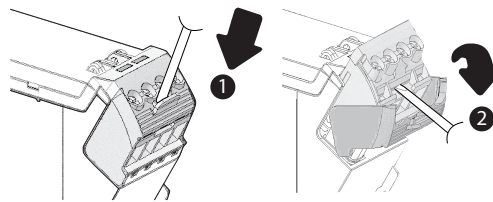
**Spacing** -. The GLP can be mounted directly next to other GSR safety relays. When the GSR Ethernet Module is used, the GSR must be mounted with 10 mm of its neighboring module to maintain effective communications.

Maintain 50.8 mm (2 in.) spacing above and below the relay for adequate ventilation.

## Removable Terminals

The GLT has removable terminals to ease wiring and replacement

**Figure 5 - Removable Terminals**



1. Insert the tip of a small, flat blade screwdriver into the slot near the terminal screws.
2. Rotate the screwdriver to unlock the terminal block.

The terminal block can then be removed from the housing.

## Enclosure Considerations

Most applications require installation in an industrial enclosure to reduce the effects of electrical interference and environmental exposure. Pollution Degree 2 is an environment where normally only non-conductive pollution occurs except that occasionally temporary conductivity that is caused by condensation can be expected. Overvoltage Category II is the load level section of the electrical distribution system. At this level, transient voltages are controlled and do not exceed the impulse voltage capability of the products insulation.

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating. This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions

that are present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection that is provided by different types of enclosure.

## **Preventing Excessive Heat**

For most applications, normal convective cooling keeps the relay within the specified operating range. Verify that the specified temperature range is maintained. Proper spacing of components within an enclosure is usually sufficient for heat dissipation.

In some applications, a substantial amount of heat is produced by other equipment inside or outside the enclosure. In this case, place blower fans inside the enclosure to help with air circulation and to reduce “hot spots” near the controller.

Additional cooling provisions might be necessary when high ambient temperatures are encountered. Do not bring in unfiltered outside air. Place the controller in an enclosure to protect it from a corrosive atmosphere. Harmful contaminants or dirt could cause improper operation or damage to components. In extreme cases, you may need to use air conditioning to protect against heat buildup within the enclosure.

## Notes:

## Power, Ground, and Wiring

### Wiring Requirements and Recommendation



**WARNING:** Before you install and wire any device, disconnect power to the system.



**WARNING:** Calculate the maximum possible current in each power and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. Current above the maximum ratings may cause wiring to overheat, which can cause damage.

- Allow for at least 50 mm (2 in.) between I/O wiring ducts or terminal strips and the relay.
- Route incoming power to the relay by a path separate from the device wiring. Where paths must cross, their intersection should be perpendicular.
- Do not run signal or communications wiring and power wiring in the same conduit. Wires with different signal characteristics should be routed by separate paths.
- Separate wiring by signal type. Bundle wiring with similar electrical characteristics together.
- Separate input wiring from output wiring.
- Label wiring to all devices in the system. Use tape, shrink-tubing, or other dependable means for labeling purposes. In addition to labeling, use colored insulation to identify wiring based on signal characteristics. For example, you may use blue for DC wiring and red for AC wiring.

### Wire Size

Each terminal can accommodate copper wire with size from 0.2 mm<sup>2</sup> (24 AWG) to 2.5 mm<sup>2</sup> (14 AWG). Use copper that withstands 60 / 75 °C.

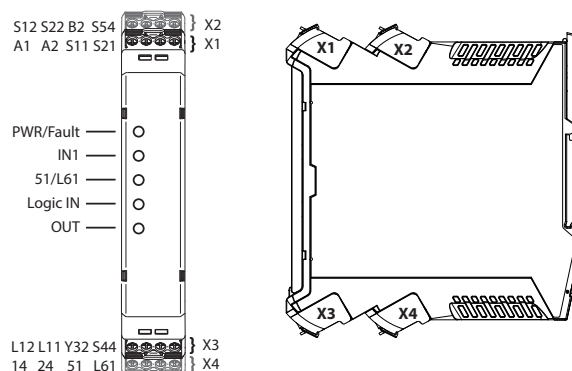
### Terminal Torque

Terminals should be torqued to 0.4 N•m (4 lb•in).

## Terminal Assignments

Some terminals are designed to have one specific function. Some terminals can perform multiple functions; these terminals must be configured during a power-up routine.

**Figure 6 - Terminal Identification**



**Table 1 - Terminal Function**

| Terminal | Function   |
|----------|--|
| A1       | +24V Supply  |
| A2       | 24V Common   |
| S11      | Safety Test Pulse Output for Channel 1   |
| S21      | Safety Test Pulse Output for Channel 2   |
| S12      | Safety Input for Channel 1   |
| S22      | Safety Input for Channel 2   |
| S44      | Reset and Lock Request Input   |
| S54      | Guardlocking Unlock Request Input  |
| Y32      | Auxiliary Nonsafety Output   |
| L11      | Single Wire Safety Output  |
| L12      | Single Wire Safety Input   |
| B2       | Retriggerable Input  |
| 51       | Guardlocking Solenoid or Delayed Safety Output Channel 1   |
| L61      | Guardlocking Solenoid or Delayed Safety Output Channel 2   |
| 14       | Immediate Safety Output Channel 1 - Logic Setting 1, 2, 5, 6, 7, 8<br>Delayed Safety Output Channel 1 – Logic Setting 3, 4 |
| 24       | Immediate Safety Output Channel 2 - Logic Setting 1, 2, 5, 6, 7, 8<br>Delayed Safety Output Channel 2 – Logic Setting 3, 4 |

## Grounding the Controller

There are no special grounding requirements. Terminal A2 must be connected to the common of a 24V supply.

## Connecting a Power Supply

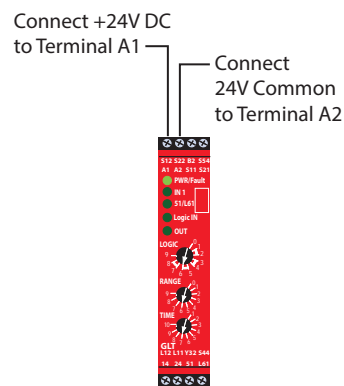
Power for the GLT must be provided by an external 24V DC power supply source.

To comply with the CE Low Voltage Directive (LVD), the GLT must be powered by a DC source compliant with Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

The following Rockwell Automation Bulletin 1606 power supplies are SELV- and PELV-compliant.

- 1606-XLP30E
- 1606-XLP50E
- 1606-XLP50EZ
- 1606-XLP72E
- 1606-XLP95E
- 1606-XLDNET4
- 1606-XLSDNET4

### Figure 7 - Power Supply Connections



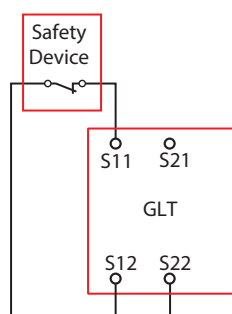
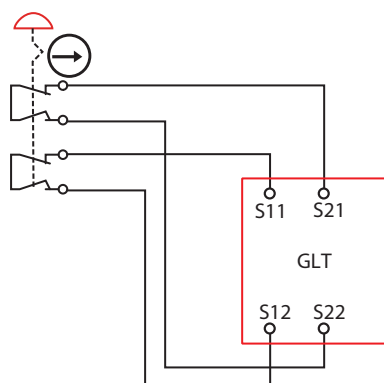
## Safety Devices

## Safety Devices with Mechanical Contacts

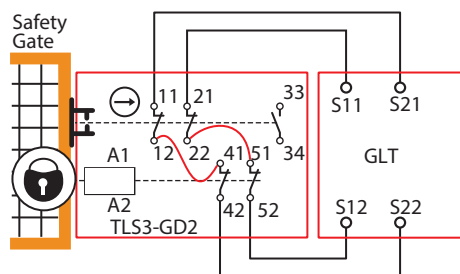
Input devices with mechanical contact outputs, such as emergency stop buttons and tongue interlock switches, use both a safety input terminal and a test pulse output terminal.

When safety devices are connected via test outputs to an input circuit on the GLT relay, wire length should be 100 m (300 ft) or less.

For the lowest risk levels, a single channel can be used by the input device. As shown in Figure 8, one side of the contact is connected to S11 (or S21). The other side of the contact must be connected to both S12 and S22. The GLT detects short circuits from the inputs (S12 and S22) to 24V DC and to 24V common.

**Figure 8 - Connecting a Single-channel Mechanical Contact**

**Figure 9 - Connecting Mechanical Contacts of a Dual-channel E-stop**


When only one dual-channel E-stop button is used, the maximum safety performance rating is Cat 4 PLe and SIL CL3.

**Figure 10 - Connecting Mechanical Contacts of a TLS3-GD2**


Since the TLS3-GD2 has multiple contacts in series, the maximum safety performance rating is Cat 3 PLd and SIL CL2.

**TIP** Pulse test output S11 can be connected to either S12 or S22. Pulse test output S21 can be connected to either S12 or S22.

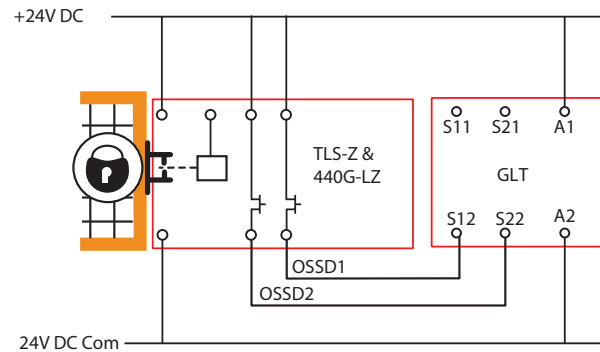
Regardless of how these are wired, performance remains the same. The GLT successfully recognizes when one or both channels open, and the GLT detects cross channel faults and single channel faults to +24V and to 24V common.



## Safety Devices with OSSD Outputs

Devices, such as light curtains, laser scanners, and solid-state interlocks have current-sourcing PNP semiconductor outputs (OSSD), which send safety signals to the GLT safety input terminal and do not use the pulse test outputs. These devices must have a common power supply reference with the GLT.

**Figure 11 - Connections to Device with OSSD Outputs**



**IMPORTANT** Both devices must have the same power supply reference.

**TIP** OSSD1 can be connected to either S12 or S22 and OSSD2 can be connected to either S12 or S22.

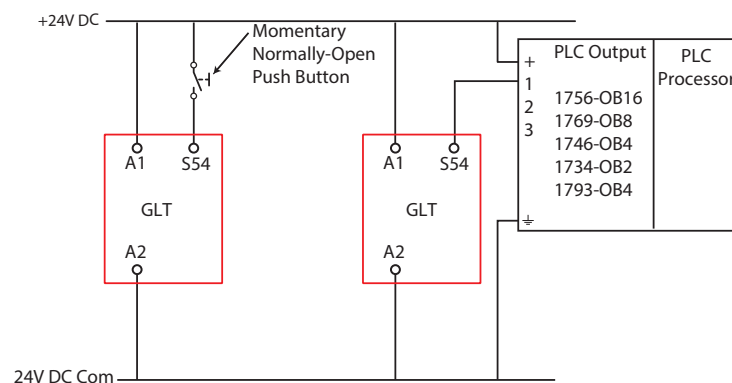
When using the TLS-ZR and 440G-LZ, the maximum safety performance rating is Cat 4 PLe and SIL CL3.

## Unlock Request Input

The Unlock Request Input can be connected to the 24V supply through a momentary, normally open push button switch or to a 24V sourcing output of a PLC, where the PLC turns the request ON or OFF. Some examples of Rockwell Automation PLC output modules are shown in [Figure 12](#).

The unlock request is connected to Terminal S54.

**Figure 12 - Unlock Request Wiring**



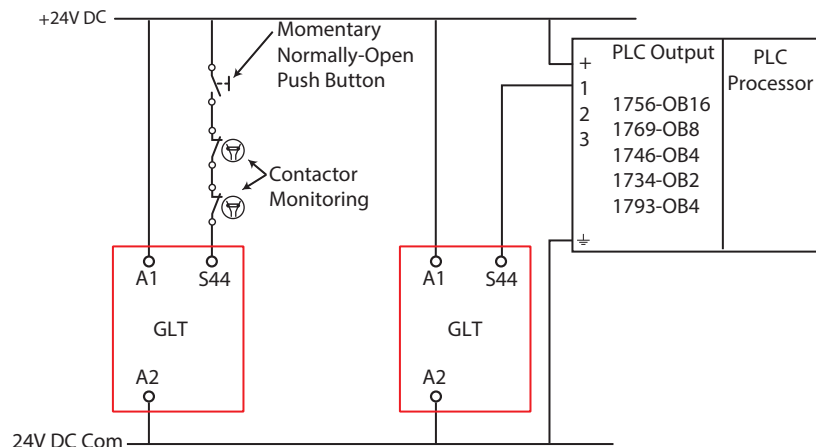
## Lock and Reset Request Input

The Lock and Reset Input can be connected to the 24V supply through a momentary, normally open push button switch or to a 24V sourcing output of a PLC where the PLC turns the request ON or OFF. Some examples of Rockwell Automation PLC output modules are shown in [Figure 13](#).

In some safety system applications, the reset signal also serves as a monitoring function. For example, when the safety outputs are driving safety contactors, the normally closed contacts of the safety contactors should be connected in series with lock and reset circuit.

The lock and reset request is connected to Terminal S44.

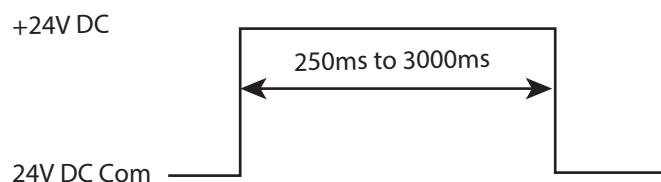
**Figure 13 - Lock Request Wiring**



## Lock and Unlock Signals

The GLT is designed to ignore incidental actuations or stuck conditions on the Lock and Unlock inputs. The lock and unlock signals must be actuated for a duration of 0.25...3 seconds. The GLT ignores signals durations that are too short or too long.

**Figure 14 - Required Signal Duration**



## Retriggerable Input

The retriggerable input is either left open for non-retriggerable operation or connected directly to the +24V DC supply for retriggerable operation. During configuration, GLT reads the status of the input to determine whether to apply the function to the safeguarding input. The retriggerable input only works with Logic Setting 5, 6, 7, and 8. Retriggerable operation is often used when long delay times are configured in the GLT.

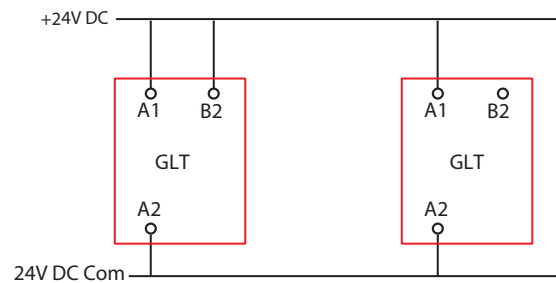
When terminal B2 is not connected to +24V DC, the safeguarding input device must be held open for the full duration of the timed delay cycle. If the input device is reclosed during the timing cycle, the PWR/Fault indicator is green with five red flashes. To clear the fault indication, cycle the input device (OFF then ON) after the completion of the timing cycle.

When terminal B2 is connected to +24V DC, the safeguarding input device can be closed before the full duration of the timed delay cycle, and this action resets the timer. When the input is reclosed during the timing cycle, the immediate outputs turn back ON immediately.



**WARNING:** The machine designer/user must confirm that the reclosing or resetting of an interlocking safeguard or E-stop device shall not initiate hazardous machine operation.

**Figure 15 - Retriggerable Input Wiring**



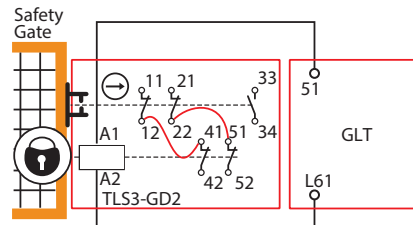
## Outputs

Terminals 51 and L61 are the time-delayed safety outputs. They can be configured for two different functions:

1. Direct connection to the solenoid of a guardlocking interlock, or
2. Direct connection to other time-delayed safeguarding devices.

The function is determined during the configuration process.

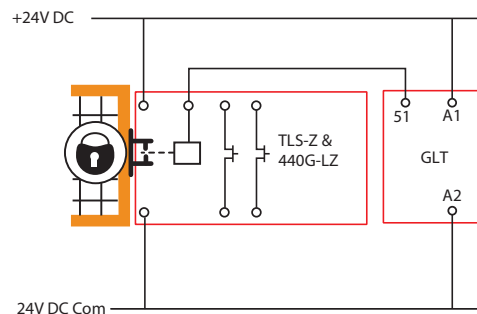
**Figure 16 - TLS1, 2, and 3 Solenoid Connections**



When using the TLS1, 2, or 3, the solenoid connections can be reversed, A1 can be connected to 51 or L61 and A2 can be connected to either 51 or L61.

**Note:** The 440G-MT solenoid cannot be connected directly to the GLT as it draws too much current; an interposing relay is required.

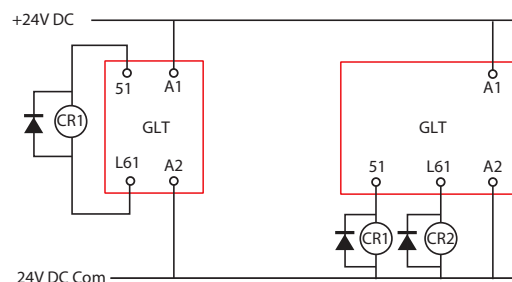
**Figure 17 - TLS-Z and 440G-LZ Solenoid Connections**



When connecting to the TLS-Z or 440G-LZ, the solenoid signal must be connected to terminal 51. Terminal L61 can also be used to drive a relay.

When multiple guards (solenoids) must be unlocked simultaneously, a safety control relay can be connected between terminal 51 and L61 or two separate safety control relays can be connected to 51 and L61. A diode suppressor should be connected in parallel across the coil.

**Figure 18 - Interposing Relay Connections**

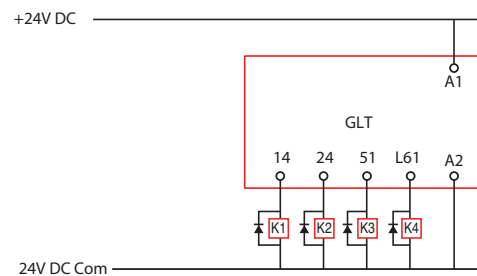


## Use Surge Suppressors

Because of the potentially high current surges that occur when switching inductive load devices, such as motor starters and solenoids, the use of some type of surge suppression to protect and extend the operating life of the controllers output is required. By adding a suppression device directly across the coil of an inductive device, you prolong the life of the outputs. You also reduce the effects of voltage transients and electrical noise from radiating into adjacent systems.

The following diagram shows an output with a suppression device. We recommend that you locate the suppression device as close as possible to the load device. Since the outputs are 24V DC, we recommend 1N4001 (50V reverse voltage) to 1N4007 (1000V reverse voltage) diodes for surge suppression for the OSSD safety outputs, as shown in [Figure 19](#). The diode should be connected as close as possible to the load coil.

**Figure 19 - Surge Suppression**



Example suppressors include

- 100-FSD250 for legacy Bulletin 100S Contactors
- 100S-C\*\*EJ contactors have built in suppression
- 1492-LD4DF terminal block with built-in 1N4007 diode
- 700-ADL1R is diode for 700-HPSXZ24 positive-guided relay

## **Notes:**

## Configuration

### Logic Switch Settings

The Logic switch determines the operating function of the GLT and is used to set the configuration. If only the Range or Time setting must be changed, the configuration process must start by setting the Logic switch to 0 or 9 when power is off.

**Table 2 - Logic Switch Setting**

| Switch 1 Setting                       | Lock/ Unlock Demand Configuration  | Delay Configuration   | Safety Inputs       |
|--|--|---|---------------------|
| 0                                      | Program mode (Pulse testing activated on terminals 14, 24, 51, and L61   |   |                     |
| 9                                      | Program mode (Pulse testing deactivated on terminals 14, 24, 51, and L61 |   |                     |
| Function 1 - Guardlocking Applications |  |   |                     |
| 1                                      | Manual monitored   | Cat. 0 Stop.<br>14, 24, L11, Y32 immediate OFF<br>51, L61 delayed ON              | Logic IN OR IN1     |
| 2                                      |  |   | Logic IN AND IN1    |
| 3                                      |  | Cat. 1 Stop<br>14, 24, L11 delayed OFF<br>51, L61 delayed ON<br>Y32 immediate OFF | Logic IN OR IN1     |
| 4                                      |  |   | Logic IN AND IN1    |
| Function 2 - E-stop Applications       |  |   |                     |
| 5                                      | Manual monitored   | 14, 24, L11, Y32 immediate OFF<br>51, L61 delayed ON                              | Logic IN OFF OR IN1 |
| 6                                      |  |   | Logic IN AND IN1    |
| 7                                      | Auto reset   | 14, 24, L11, Y32 immediate OFF<br>51, L61 delayed ON                              | Logic IN OFF OR IN1 |
| 8                                      |  |   | Logic IN AND IN1    |



**ATTENTION:** When the GLT is configured for settings 5 or 7 and an E-stop device is connected to IN1, there must be no connection to the Logic IN (terminal L12). E-stops must be available at all times and cannot be bypassed or muted with 'OR' logic.

## Range Switch Setting

The Range switch sets the maximum time for the delay. The range is then adjusted by the Time switch setting.

**Table 3 - Range Switch Setting**

| Range Switch Setting | Maximum Delay Time               | Range Switch Setting | Maximum Delay Time |
|----------------------|----------------------------------|----------------------|--------------------|
| 0                    | 0.5 s without 10% <sup>(1)</sup> | 5                    | 30 s               |
| 1                    | 1 s                              | 6                    | 1 min              |
| 2                    | 3 s                              | 7                    | 3 min              |
| 3                    | 5 s                              | 8                    | 10 min             |
| 4                    | 10 s                             | 9                    | 30 min             |

(1) To use the Range setting of zero, the Time setting must be set to something other than 1.

## Time Switch Setting

The Time switch sets the adjustment to the Range.

**Table 4 - Time Switch Setting**

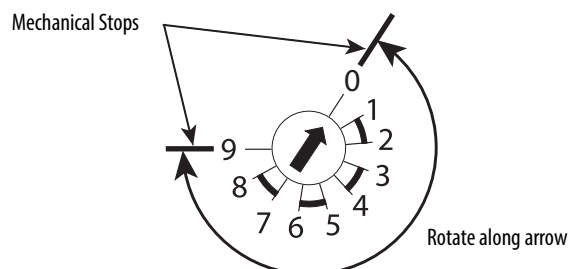
| Time Switch Setting | Delay Adjustment (%) | Time Switch Setting | Delay Adjustment (%) |
|---------------------|----------------------|---------------------|----------------------|
| 1                   | 10                   | 6                   | 60                   |
| 2                   | 20                   | 7                   | 70                   |
| 3                   | 30                   | 8                   | 80                   |
| 4                   | 40                   | 9                   | 90                   |
| 5                   | 50                   | 10                  | 100                  |

**EXAMPLE** With the Range set to 4 and Time set to 4, the delay is:  
 $10 \text{ seconds} \times 40\% / 100 = 4 \text{ seconds}$

## Configuration Switches

Use a small slotted screwdriver to set the switches to the desired setting. The configuration switches are multi-position switches with a limited rotation.

**Figure 20 - Configuration Switch Adjustment**



**IMPORTANT** Adjust the switches gently and do not turn past the mechanical stops.



## Configuration Process

Configuration is a five-step process. The process requires the wiring to the GLT to be completed. During the configuration process, GLT sends out test pulses to determine how it is wired and then configures the internal parameters to match the application.

### Five Step Configuration

The GLT is configured in five steps:

1. With the power OFF, set the Logic switch to either 0 or 9.
2. Apply power.
3. Adjust the Logic, Range, and Time switches.
4. Verify the settings by counting the blink rates of the LEDs
5. Cycle the power to store the settings

### Configuration Details

1. The GLT sends out signals during the configuration process, so the wiring must be complete.  
Set the Logic switch to:
  - 0 if you want pulse testing active on terminals 14 and 24
  - 9 if you want pulse testing deactivated.
2. Power up the module.  
The PWR/Fault LED flashes red continuously. The prior configuration in the EEPROM is erased and the device now prepared for a new configuration.
3. Set the Logic, Range, and Time switch settings for your application.

After 500 ms, the new configuration parameters are acknowledged.

After 300 ms, the new parameter is stored in the EEPROM, the power LED is solid green.

**TIP** You can change (or readjust) the switch settings during Step 3 and 4. The power LED will flash red again, momentarily.

4. Verify the settings  
The LEDs flash for 0.5 second to indicate the switch setting. The number of flashes is equal to the switch setting. The blinking repeats after a 2 second pause.

**Figure 21 - Example of the LEDs flashing during Configuration Mode:**

IN1 – Indicates the LOGIC Switch is set to 3



51/L61 – Indicates the RANGE Switch is set to 4



Logic IN – Indicates the TIME switch is set to 1



OUT – Indicates the solenoid connection to Guardlocking Switch with OSSD outputs.



5. Cycle the power to the GLT. After power-up, the current switch settings are compared to the values in the EEPROM, and the input and output circuits are checked. Upon successful completion of the internal checks, the GLT is ready for operation.

The OUT LED indicates the type of connection that is made to terminals 51 and L61. [Table 5](#) shows the conditions for the OUT LED blink rates.

**Table 5 - OUT LED Blink Rates**

| OUT LED Blinks | Guardlocking Switch   | 51          | L61        | Guardlocking Function | E-Stop Function |
|----------------|---|-------------|------------|-----------------------|-----------------|
| 1 time         | OSSD Guardlocking switch (e.g., TLS-ZR or 440G-LZ) or E-Stop function | High Side   | High Side  | Yes                   | Yes             |
| 2 times        | Standard Guardlocking Switch (e.g., TLS3-GD2)                         | High Side   | Low Side   | Yes                   | No              |
| 3 times        | Next Generation Guardlocking Switch                                   | No Function | Logic Link | Yes                   | No              |

## Diagnostic LEDs and Troubleshooting

The GLT has five LED indicators to provide operating status and diagnostic information.

### LEDs During Power-Up

During power-up, the LEDs turn ON and OFF during their self-check process. The self-check takes about 3 seconds.

### LEDs During Normal Operation

Table 6 - Normal Operation LEDs

| LED Indicator | State                   | Description  |
|---------------|-------------------------|--|
| PWR/FAULT     | Solid Green             | Normal operation   |
|               | Blinking Red            | See <a href="#">LEDs During Diagnostics</a> for possible faults. Correct fault and cycle power |
|               | Green with Blinking Red | See <a href="#">LEDs During Diagnostics</a> for possible faults. Correct fault and press reset |
| IN            | ON                      | Input circuits at S12 and S22 are closed   |
|               | OFF                     | Input circuits at S12 and S22 are open   |
| S1/L61        | ON                      | Gate is locked   |
|               | OFF                     | Gate is unlocked   |
|               | Blinking                | Timing cycle has started   |
| LOGIC IN      | ON                      | Logic IN signal at L12 is active   |
|               | OFF                     | Logic IN signal at L12 is OFF  |
| OUT           | ON                      | L11 is active and 14/24 are ON<br>Y32 is ON  |
|               | OFF                     | Outputs are OFF  |
|               | Blinking                | Waiting for reset signal or timing cycle has started   |

### LEDs During Diagnostics

Diagnostics are indicated by the flashing of the LED indicators. The PWR/Fault indicator shows the major fault. The IN1 indicator shows more detail.

The flashing rate pauses and then repeats itself.

---

**IMPORTANT** For accurate diagnostics, always start counting after the first pause. The first cycle may not be accurate.

---

**Table 7 - Diagnostic LEDs**

| Power/Status LED                | Status/Faults   |
|---------------------------------|---|
| Solid red                       | An undeclared fault has occurred.<br>Cycle power to clear the fault and return the GLT to an operational state.   |
| Flashing red 1 time             | The GLT is in configuration mode.<br>When the Logic Switch is set to 0 or 9 and the power is cycled, the PWR/Fault LED will blink at a 1X rate. The GLT is in configuration mode. Rotate the switches to the desired positions and cycle power.   |
| Green with Flashing red 2 times | The configuration does not agree with the EPROM.<br>One or more of the rotary switches have changed during operation. The GLT will continue to operate, and the switch(es) can be returned to their original position. If the outputs are ON, turn the outputs OFF and press reset to clear the fault.  |
| Green with Flashing red 3 times | The connection to terminal B2 has changed.<br>The GLT will continue to operate, and the connection can return to its original status. If the outputs are ON, turn the outputs OFF and press reset to clear the fault.   |
| Green with Flashing red 4 times | The safety inputs were closed before the delay time expired.<br>Open the safety input for the full time cycle. Or connect B2 to 24V and reconfigure the GLT for retriggerable inputs.   |
| Green with Flashing red 5 times | The gate appears open when it supposed to be closed and locked.<br>The IN1 indicator is OFF - input signals are corrupt.<br>The 51/L61 indicator is ON - gate should be locked.<br>Possible fault conditions: <ul style="list-style-type: none"> <li>• Gate is open</li> <li>• Open circuit on S12</li> <li>• Open circuit on S22</li> <li>• Short from S12 to S22</li> <li>• Short from S12 or S22 to +24V DC</li> <li>• Short from S12 or S22 to 24V Common.</li> </ul> Check the voltage at terminals S12 and S22. Both should have 24V DC.<br>Correct the fault. Press Reset to clear the flashing red indication. Press Reset again to turn the outputs ON. Cycle both input signals (or cycle power) to return the GLT to an operational state. |
| Flashing red 2 times            | Upon power up, one or more of the rotary switch settings do not agree the value stored in the EEPROM.<br>Return the switches to their originally configured settings and cycle power or reconfigure the GLT.  |
| Flashing red 5 times            | IN1 is flashing 12 times. <ul style="list-style-type: none"> <li>• Short circuit fault on terminal L11 to 24V.</li> <li>• Short circuit fault on terminal L11 to ground.</li> <li>• With OSSD Guardlocking or E-stop function . . .</li> <li>• Short circuit fault on terminal 51 to ground.</li> </ul> Correct the fault and cycle power to the GLT.   |
| Flashing red 6 times            | IN1 is flashing 7 times <ul style="list-style-type: none"> <li>• Short circuit fault on terminal 14 to ground or</li> <li>• Short circuit fault on terminal 24 to 24V with pulse testing</li> </ul> IN1 is flashing 8 times <ul style="list-style-type: none"> <li>• Short circuit fault on terminal 24 to ground or</li> <li>• Short circuit fault on terminal 24 to 24V with pulse testing or</li> <li>• Short circuit fault from terminal 14 to terminal 24 with pulse testing.</li> </ul> Correct the fault and cycle power to the GLT.   |
| Flashing red 9 times            | IN1 is flashing 9 times <ul style="list-style-type: none"> <li>• Short circuit from terminal 51 to L61</li> <li>• Open circuit on terminal 51 or L61</li> </ul> IN1 is flashing 10 times <ul style="list-style-type: none"> <li>• Short circuit fault on terminal 51 or L61 to ground or</li> <li>• Short circuit fault on terminal 51 or L61 to 24V.</li> </ul> Correct the fault and cycle the power to the GLT.  |
| Flashing red 10 times           | IN1 is flashing 33 times <ul style="list-style-type: none"> <li>• The supply voltage exceeded 26.4V DC - Overvoltage</li> </ul> Correct the power supply and cycle the power.   |

## Additional Diagnostics

The IN1 Indicator LED flashes additional information regarding faults that are detected by the GLT. [Table 8](#) provides a description of the fault for each of the flash rates. You should inspect wiring, measure the voltages/waveforms at the respective terminals, check the configuration switches, and if necessary, report the fault to the factory.

**Table 8 - Flash Rate Fault Description**

| Flashes | Description                                       |
|---------|---|
| 0       | No fault  |
| 5       | S11 Pulse Test Fault                              |
| 6       | S21 Pulse Test Fault                              |
| 7       | OSSD1 Fault (Terminal 14)                         |
| 8       | OSSD2 Fault (Terminal 24)                         |
| 9       | Terminal L61                                      |
| 10      | Terminal 51                                       |
| 11      | SPI Fault   |
| 12      | L11 Fault   |
| 13      | Guardlocking system is different from EPROM.      |
| 14      | Configuration switch(es) is different from EPROM. |
| 15      | EPROM fault                                       |
| 17      | Compare state fault                               |
| 22      | Cross fault                                       |
| 23      | Wiring at B2 is different from EPROM              |
| 24      | Input is open when gate is locked                 |
| 25      | Switch overflow                                   |
| 30      | S12 fault   |
| 31      | S22 fault   |
| 32      | Main transistor fault                             |
| 33      | Overvoltage                                       |
| 34      | S44 or S54 fault                                  |

## **Notes:**

## Pulse Testing Functions

### Pulse Testing For Inputs

Pulse testing for the inputs is always active. The pulses are generated at terminals S11 and S21. These test pulses should be used with devices that have mechanical contacts.

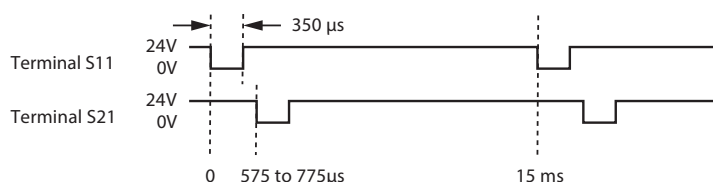
S11 is typically connected to one contact and the other side of the contact is connected to S12. S21 is typically connected to the second contact, and the other side of the second contact is connected to S22.

The test pulses are used by the GLT to detect three short circuit conditions:

1. Between the input terminals and +24V
2. Between the input terminals and 24V common
3. Between the two input terminals

[Figure 22](#) shows the timings of the two test pulses. The pulse on S21 occurs shortly after S11. The pulses are repeated every 15 ms.

**Figure 22 - Pulse Test Signals**

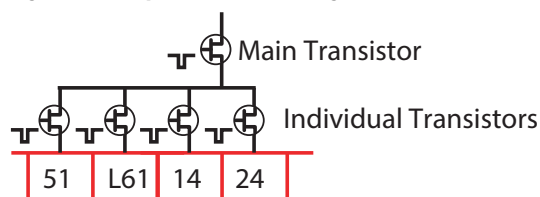


### Pulse Testing of Outputs

When the GLT configuration process starts from Logic Switch setting 0, the 14, 24, 51, and L61 outputs are pulse tested. The purpose of the pulse testing is to detect short circuits to 24V, to 24V common, and short circuits between the output terminals. The use of pulse testing allows the GLT to be used in PLe and SIL3 applications. Without pulse testing, the GLT can only be used in applications up to PLd and SIL2.

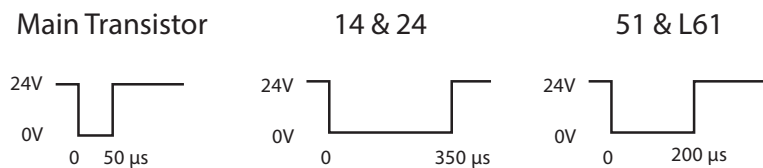
The outputs have built in redundancy. A main transistor supplies power to individual transistors for each output terminal as shown in [Figure 23](#).

**Figure 23 - Output Transistor Arrangement**



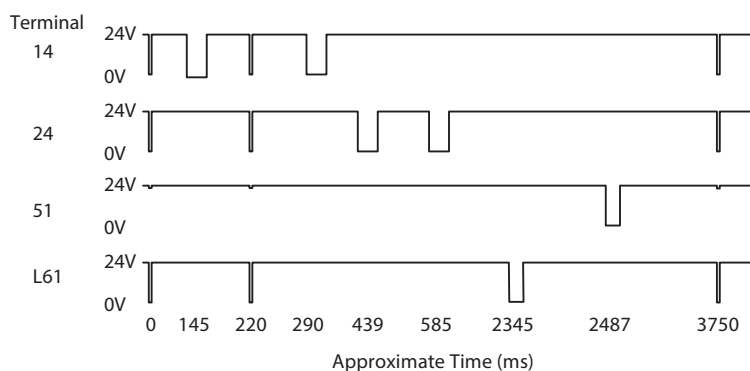
When pulse testing is configured (start with Logic Setting 0), the outputs are tested by the main transistor and then tested individually. The main transistor test pulse is 50  $\mu$ s wide. The pulse width on terminals 14 and 24 is 350  $\mu$ s wide, and the pulse width on terminals 51 and L61 is 200  $\mu$ s wide.

**Figure 24 - Output Pulse Test Width**



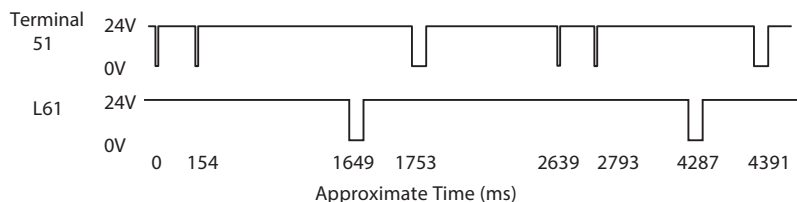
[Figure 25](#)...[Figure 27](#) show the pulse test pattern. This pattern depends on the GLT configuration and its state. [Figure 25](#) shows the pulse pattern for E-stop configurations. The pattern is repeated every 3750 ms.

**Figure 25 - Output Pulse Test Pattern for E-stop Functions**



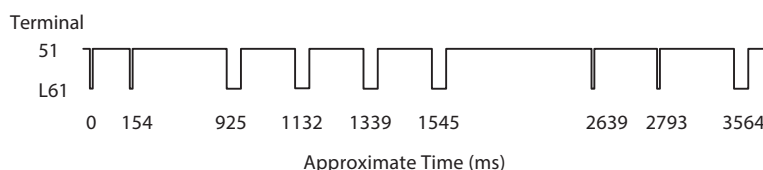
[Figure 26](#) shows the pulse test pattern on 51 and L61 when the GLT is configured as two high side outputs. The pattern is repeated every 2639 ms.

**Figure 26 - Output Pulse Test Pattern for Two High Side Guardlocking**



[Figure 27](#) shows the pulse test pattern on 51 and L61 when the GLT is configured as a high side/low side outputs. Terminal 51 is referenced to L61, not 24V common. The pattern is repeated every 2639 ms.

**Figure 27 - Output Pulse Test Pattern for High/Low Side Guardlocking**





## Specifications

### General

|                                   |   |
|-----------------------------------|---|
| <b>Dimensions, W x H x D</b>      | 22.5 x 119.14 x 113.6 mm (0.88 x 4.69 x 4.47 in.) |
| <b>Shipping Weight, approx.</b>   | 150 g (0.33 lb)                                   |
| <b>Wire Size</b>                  | 0.2...2.5 mm <sup>2</sup> (24...14 AWG)           |
| <b>Wiring Category</b>            | Copper that withstands 75 °C (167 °F)             |
| <b>Terminal Screw Torque</b>      | 0.4 N•m (4 lb•in)                                 |
| <b>Power Supply Voltage Range</b> | 24V DC PELV/SELV<br>0.85...1.1 x rated voltage    |
| <b>Power Consumption</b>          | 2 W   |
| <b>Fuse</b>                       | 4A gG (slow blow)                                 |
| <b>Case Material</b>              | Polyamide PA 6.6                                  |
| <b>Terminal Protection</b>        | IP20  |
| <b>Enclosure Protection</b>       | IP40 (NEMA 1)                                     |

### Environmental

|                              |                           |
|------------------------------|---------------------------|
| <b>Operating Temperature</b> | -5...+55 °C (23...131 °F) |
| <b>Relative Humidity</b>     | 90%                       |
| <b>Vibration</b>             | 10...55 Hz, 0.35 mm       |
| <b>Shock</b>                 | 10 g, 16 ms               |
| <b>Pollution Level</b>       | 2                         |

## Inputs IN1

|   |                                      |
|---|--------------------------------------|
| <b>Input Signals (Active High)</b>  | S12, S22                             |
| <b>Input Simultaneity</b>   | Infinite                             |
| <b>ON Voltage (Max)</b>   | 26.4V                                |
| <b>ON Voltage (Min)</b>   | 11V                                  |
| <b>OFF Voltage (Max)</b>  | 5V                                   |
| <b>OFF Current (Max)</b>  | 2 mA                                 |
| <b>ON Current (Max) at 24 VDC</b>   | 11 mA                                |
| <b>ON Current (Max) at 26.4 VDC</b>   | 11.1 mA                              |
| <b>Galvanic Isolation: I/O from Logic</b>                                     | No                                   |
| <b>Overvoltage Protection</b>   | Yes                                  |
| <b>Test Out Pulse Duration</b>  | 700 $\mu$ s                          |
| <b>Test Out Pulse Period</b>  | 17 ms                                |
| <b>Off Pulse accepted for OSSD setting without declaring the input as OFF</b> | Min = 0 $\mu$ s<br>Max = 700 $\mu$ s |
| <b>Reverse Voltage Protection</b>   | Yes                                  |
| <b>Input Capacitance</b>  | 10 nF                                |

## Lock Unlock Request

|   |             |
|---|-------------|
| <b>Input Signals (Active High)</b>        | S44, S54    |
| <b>ON Voltage (Max)</b>                   | 26.4V       |
| <b>ON Voltage (Min)</b>                   | 11V         |
| <b>OFF Voltage (Max)</b>                  | 5V          |
| <b>OFF Current (Max)</b>                  | 2 mA        |
| <b>ON Current (Max) at 24 VDC</b>         | 11 mA       |
| <b>ON Current (Max) at 26.4 VDC</b>       | 11.1 mA     |
| <b>Galvanic Isolation: I/O from Logic</b> | No          |
| <b>Overvoltage Protection</b>             | Yes         |
| <b>Input Capacitance</b>                  | 10 nF       |
| <b>Duration</b>                           | 0.5...3.0 s |

## Retrigger

|   |         |
|---|---------|
| <b>Input Signal (Active High)</b>         | B2      |
| <b>ON Voltage (Max)</b>                   | 26.4V   |
| <b>ON Voltage (Min)</b>                   | 11V     |
| <b>OFF Voltage (Max)</b>                  | 5V      |
| <b>OFF Current (Max)</b>                  | 2 mA    |
| <b>ON Current (Max) at 24 VDC</b>         | 11 mA   |
| <b>ON Current (Max) at 26.4 VDC</b>       | 11.1 mA |
| <b>Galvanic Isolation: I/O from Logic</b> | No      |
| <b>Overvoltage Protection</b>             | Yes     |
| <b>Input Capacitance</b>                  | 10 nF   |

## Outputs

|  |                                  |
|--|----------------------------------|
| <b>Number of Outputs</b>   | 4                                |
| <b>Output Signals (Active High)</b>                              | S11, S21, 14, and 24             |
| <b>Continuous Output Current</b>                                 | 0.5 A                            |
| <b>Aggregate Current of Outputs per Module (Max)</b>             | 1.8 A                            |
| <b>Surge Output Current (Max)</b>                                | 1.5 A                            |
| <b>Surge Output Current Duration (Max)</b>                       | 5 ms                             |
| <b>Residual Voltage (Drop from Power Supply), Max</b>            | 0.2V                             |
| <b>Max Load Capacitance</b>                                      | 1 $\mu$ F                        |
| <b>Off State Leakage Current (Max)</b>                           | < 0.1 mA                         |
| <b>Short Circuit Protection</b>                                  | Yes                              |
| <b>Galvanic Isolation: I/O from Logic</b>                        | No                               |
| <b>Pulse Test Duration</b>                                       | $\leq 700 \mu$ s                 |
| <b>Pulse Test Period</b>   | $\leq 13000$ ms (less than 15 s) |
| <b>Maximum Resistance for the Auto Detection of a Coil</b>       | 10k                              |
| <b>Maximum Resistance for the Auto Detection of an LL Device</b> | 10k                              |

## Lock Unlock Signals

|  |            |
|--|------------|
| <b>Output Signals</b>                      | 51 & L61   |
| <b>Continuous Output Current (Max)</b>     | 0.3 A      |
| <b>High Side Voltage (Max)</b>             | 26.4V      |
| <b>High Side Voltage (Min)</b>             | 15V        |
| <b>Low Side Voltage (Max)</b>              | 3V         |
| <b>Surge Output Current (Max)</b>          | 3 A        |
| <b>Surge Output Current Duration (Max)</b> | 10 $\mu$ s |
| <b>Load Capacitance (Max)</b>              | 1 $\mu$ F  |
| <b>Off State Leakage Current (Max)</b>     | < 0.1 mA   |
| <b>Short Circuit Protection</b>            | Yes        |

## Auxiliary Signal

|   |          |
|---|----------|
| <b>Output Signals</b>                         | Y32      |
| <b>Continuous Output Current (Max)</b>        | 50 mA    |
| <b>ON State Voltage Drop (P/S to +) (Max)</b> | 0.2V     |
| <b>Surge Output Current (Max)</b>             | 700 mA   |
| <b>Surge Output Current Duration (Max)</b>    | 5 ms     |
| <b>Load Capacitance (Max)</b>                 | —        |
| <b>Off State Leakage Current (Max)</b>        | < 0.1 mA |
| <b>Short Circuit Detection</b>                | No       |
| <b>Short Circuit Protection</b>               | Yes      |
| <b>Galvanic Isolation: I/O from Logic</b>     | No       |

## Single Wire Safety Input Signal

|   |         |
|---|---------|
| <b>Input Signals</b>                      | L12     |
| <b>ON Voltage (Max)</b>                   | 26.4V   |
| <b>ON Voltage (Min)</b>                   | 11V     |
| <b>OFF Voltage (Max)</b>                  | 5V      |
| <b>OFF Current (Max)</b>                  | 2 mA    |
| <b>ON Current (Max) at 24 VDC</b>         | 11 mA   |
| <b>ON Current (Max) at 26.4 VDC</b>       | 11.1 mA |
| <b>Galvanic Isolation: I/O from Logic</b> | No      |
| <b>Overvoltage Protection</b>             | Yes     |
| <b>Reverse Voltage Protection</b>         | Yes     |
| <b>Input Capacitance</b>                  | 10 nF   |

## Single Wire Safety Output Signal

|   |           |
|---|-----------|
| <b>Output Signals</b>                         | L11       |
| <b>Continuous Output Current (Max)</b>        | 50 mA     |
| <b>ON State Voltage Drop (P/S to +) (Max)</b> | 0.2V      |
| <b>Surge Output Current (Max)</b>             | 700 mA    |
| <b>Surge Output Current Duration (Max)</b>    | 5 ms      |
| <b>Max Load Capacitance</b>                   | 1 $\mu$ F |
| <b>Off State Leakage Current (Max)</b>        | < 0.1 mA  |
| <b>Short Circuit Detection</b>                | No        |
| <b>Short Circuit Protection</b>               | Yes       |
| <b>Galvanic Isolation: I/O from Logic</b>     | No        |

## Recovery Times

|                    | Logic 1...4 |       |           | Logic 5...8 |       |          |
|--------------------|-------------|-------|-----------|-------------|-------|----------|
|                    | 14, 24      | L11   | Cat 1 Y32 | 14, 4       | L11   | Cat1 Y32 |
| <b>Reset (S44)</b> | 26 ms       | 26 ms | 23 ms     | 27 ms       | 28 ms | 25 ms    |

## Response Times

|                                      | Logic 1...4 |       |           | Logic 5...8 |       |          |
|--------------------------------------|-------------|-------|-----------|-------------|-------|----------|
|                                      | 14, 24      | L11   | Cat 1 Y32 | 14, 4       | L11   | Cat1 Y32 |
| <b>Unlock Request (S54)</b>          | 32 ms       | 27 ms | 32 ms     | —           | —     | —        |
| <b>Single Wire Safety Input, L12</b> | 48 ms       | 48 ms | 49 ms     | 37 ms       | 35 ms | 38 ms    |
| <b>Safety Inputs (S12, S22)</b>      | 68 ms       | 61 ms | 70 ms     | 55 ms       | 51 ms | 57 ms    |

## Notes:

## Regulatory Approvals

### Agency Certifications

- UL Listed Industrial Control Equipment, certified for US and Canada.
- CE marked for all applicable directives
- C-Tick marked for all applicable acts
- CCC Mark
- S-Mark

### Compliance to European Union Directives

This product has the CE mark and is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

### Machine Safety Directive

This product is designed and tested to meet the European Council Directive 2006/42/EC on machinery and the following standards.

- IEC/EN 61508 - Functional safety of electrical/electronic/programmable electronic safety-related systems
- IEC/EN 62061 - Safety of machinery - Functional safety of safety-related electrical, electronic, and programmable electronic control systems
- EN ISO 13849-1 - Safety of machinery -- Safety-related parts of control systems -- Part 1: General principles for design.

This product is intended for use in an industrial environment.

The performance of the safety function is dependent on the structure of all devices that comprise the safety function. The following two tables provide the data that must be used to represent the GLT when calculating the Safety Integrity Level (SIL) or the Performance Level (PL).

## SIL Rating

The GLT can be used in applications up to SIL 3 in accordance with IEC 61508 and IEC 62061.

|   |             |
|---|-------------|
| <b>Safety Integrity Level Claim Limit</b> | 3           |
| <b>PFD</b>                                | 1.43 E-3    |
| <b>PFH</b>                                | 8.11 E-9    |
| <b>Mode of Operation</b>                  | High demand |
| <b>Hardware Fault Tolerance</b>           | 1           |
| <b>Safe Failure Fraction</b>              | 99%         |

## Performance Level/Category

The GLT is capable of being used in safety systems meeting up to Category 4 and Performance Level PLe in accordance with ISO 13849-1.

|                               |         |
|-------------------------------|---------|
| <b>Category</b>               | Up to 4 |
| <b>Performance Level</b>      | Up to e |
| <b>MTTFd</b>                  | 352     |
| <b>DC Avg</b>                 | 99%     |
| <b>Mission Time (a)</b>       | 20      |
| <b>Days of Operation (d)</b>  | 365     |
| <b>Hours of Operation (h)</b> | 24      |
| <b>t cycle (h/s)</b>          | 8/28.8  |

## EMC Directive

This product is designed and tested to meet the European Council Directive 2004/108/EC on Electromagnetic Compatibility (EMC) and the following standards:

- EN 61000-6-4: Generic Standards - Emission Standard for Industrial Environments
- EN 61000-6-2: Generic Standards - Immunity for Industrial Environments

This product is intended for use in an industrial environment.





# Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

## Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

|                                 |  |
|---------------------------------|--|
| United States or Canada         | 1.440.646.3434   |
| Outside United States or Canada | Use the <a href="#">Worldwide Locator</a> at <a href="http://www.rockwellautomation.com/rockwellautomation/support/overview.page">http://www.rockwellautomation.com/rockwellautomation/support/overview.page</a> , or contact your local Rockwell Automation representative. |

## New Product Satisfaction Return

Rockwell Automation tests all of its products to help verify that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

|                       |   |
|-----------------------|---|
| United States         | Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process. |
| Outside United States | Please contact your local Rockwell Automation representative for the return procedure.  |

## Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

**[www.rockwellautomation.com](http://www.rockwellautomation.com)**

### Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444  
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640  
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846